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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/744,043	03/14/2001	Stephen Charles Davis	602-1505	2334

7590 02/26/2003

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EXAMINER	
GURZO, PAUL M	
ART UNIT	PAPER NUMBER
2881	

DATE MAILED: 02/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No.	Applicant(s)	
	09/744,043	DAVIS ET AL.	
	Examiner	Art Unit	
	Paul Gurzo	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-25 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-25 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4, 7, 8, 11, 12, 14-17, 19-21, and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reed et al. (5,619,034), in view of Park (6,107,625), and further in view of Cotter et al. (5,202,563).

Regarding claims 1 and 23, Reed et al. teach the use of a source chamber for generating a particle beam. This particle beam is then accelerated (col. 4, lines 36-42). They also teach the use of multiple detectors and the value of each delay of the signals equals the phase time of the corresponding detector (col. 6, lines 33-42). They do not teach improving the accuracy of measurement of the m/z values of ions. However, Park teaches reflecting ions in a way that those with the same mass-to-charge ratio will have the same flight time. This reflecting makes the flight path longer and increases the mass resolving power of the spectrometer (col. 7, line 59 to col. 8, line 20). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use multiple detectors to make improvement in the accuracy of the mass/charge values of the ions because accuracy is important in the determination of mass and charge ratio characteristics.

The above-applied prior art does not explicitly teach a detector that intercepts part of the ion beam and permits a second portion to continue past. However, Cotter et al.

teach a detector (D3) that has a small diameter hole in the center for passage of the ion beam, and ions are selected for passage through the detector (col. 7, line 63 - col. 8, line 19, and fig. 1). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to allow part of the ion beam to pass through the detector so that an accurate MS/MS spectra is obtained.

Regarding claim 4, Reed et al. show, in figure 3, a beam 22 that is accelerated in chamber 16. This beam is inclined, in the direction of the acceleration, at angle Θ with respect to the horizontal axis.

Regarding claim 7, Reed et al. teach the generation of a primary beam but do not teach how this beam is generated. However, Park describes a pulse of ions produced by laser ionization. These ions are then accelerated along the axis of the analyzer toward the reflectron (col. 12, lines 22-25).

Regarding claims 8,12,20, and 24, Reed et al. teach the generation of a primary beam but do not teach a means for delaying the operation of the acceleration means. However, Park describes that the ions produced by laser ionization are reflected back and forth between the reflectron and the accelerator and indefinite number of times (col. 12, lines 26-33). This reflecting serves to delay the operation of the acceleration means by temporarily trapping the particles released from the source prior to the acceleration.

Regarding claim 11, it is well known in the art to use a MALDI-TOF spectrometer.

Regarding claim 14, the above-applied prior art teaches releasing the ionized particles from the sample and measuring the time of arrival of the particles at two points of differing distances from the sample to determine m/z characteristics with the ability to

allow part of the ion beam to be detected and part to continue past the detector. Further, Cotter et al. depict, in fig. 1, the claimed acceleration along two paths with detectors (D1-D5) measuring the times of arrival at multiple points on the respective paths. While it is obvious that the detector D3 can be placed at the focal point, Cornish et al. teach that the detector is located at the focal point (col. 3, lines 35-38). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to place the detector at the focal point because it can be used to record the entire mass ranges at maximum resolution in each time measurement cycle.

Regarding claim 15, Reed et al. teach the use of a source chamber for generating a particle beam. This particle beam is then accelerated (col. 4, lines 36-42). They also teach the use of multiple detectors and the value of each delay of the signals equals the phase time of the corresponding detector (col. 6, lines 33-42). Park teaches reflecting ions in a way that those with the same mass-to-charge ratio will have the same flight time. This reflecting makes the flight path longer and increases the mass resolving power of the spectrometer (col. 7, line 59 to col. 8, line 20). Cotter et al. teach a detector (D3) that has a small diameter hole in the center for passage of the ion beam, and ions are selected for passage through the detector (col. 7, line 63 - col. 8, line 19, and fig. 1), and fig. 1 clearly depicts the claimed two paths in which both of the paths are contained in a single particle beam with one path running alongside but stopping short of the other.

Regarding claim 16, Cotter et al. depict the serpentine shape in fig. 1.

Regarding claim 17, the above-applied prior art teaches the ion source, accelerator, and first and second detectors. Further, Cotter et al. depict the claimed first reflectron (R1) disposed between the first and second detectors in fig.1. They also teach

the second detector positioned to intercept part of the ion beam and allow the rest to be transmitted as taught above.

Regarding claim 19, it is obvious that any of the detectors taught by Cotter et al. can be multi-element.

Regarding claim 21, Cotter et al. depict a third and fourth, etc. detector (D3,D4, etc.) as well as a second reflectron (R2) in fig.1.

Regarding claim 25, the selection of parent ions in obvious in view of the prior art.

Claims 2, 3, 6, 9-10, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reed et al. (5,619,034) in view of Park (6,107,625), in view of Cotter et al. (5,202,563), and further in view of Park et al. (5,753,909).

Regarding claim 2, in the above applied prior art, Reed et al. teach a focusing means (col. 4, lines 41-43) but fail to teach the use of two temporal focal points. However, Park et al. teaches these two temporal focal points with each detector situated at a respective temporal focal point (fig. 1, ref. 6 and 7). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement a focusing means providing two temporal focal points so that improvements can be made in the accuracy of the mass/charge values of the ions.

Regarding claim 3, the above applied prior art does not explicitly state a transportation means from the sample to the acceleration means. However, Reed et al. teaches that a primary beam is generated from a target surface at location A. These particles are then ejected from A and accelerated into chamber 16 (col. 4, lines 36-42).

While not stated, the design makes use of a transportation means because these particles must be moved in some way from the sample to the accelerations means.

Regarding claim 6, Park et al. show, in figure 1, a reflection means 5 that is positioned in the path of the beam and the first detector 6. This figure clearly depicts the serpentine shape that is claimed.

Regarding claims 9 and 10, Reed et al., in figure 2, illustrate the character of the signals from the respective locations. Each signal represents the arrival of the portions at the detector and is shown by a peak. The signals are substantially similar except that they are displaced by phase according to time of arrival (col. 4, lines 51-59). While Reed et al. does not explicitly state the use of a data acquisition means, Park et al. show this data processing means, that is connected to both detectors, in figure 1.

Regarding claim 22, Park et al. teach the use of an ion gate between two regions (col. 6, lines 27-38).

Claims 5 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reed et al. (5,619,034) in view of Park (6,107,625), in view of Cotter et al. (5,202,563), and further in view Cornish et al. (5,464,985).

Regarding claim 5, the above-applied prior art teaches all of the limitations of the claim except the act of reflecting particles so that those with a higher kinetic energy travel a longer path. However, Cornish et al. teach that ions with higher kinetic energy penetrate the reflectron more deeply than those with lower kinetic energy, and thus travel a longer path to their focal point (col. 3, lines 62-65). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to reflect the particles with higher kinetic energy to a longer path so they do not overtake the particles

with lower kinetic energy so that the variations in initial kinetic energy will not reduce the mass accuracy of the spectrometer.

Regarding claim 18, it is known that commonly held that the overtaking of certain particles with occur at the focal point and Cornish et al. teach the use of a focal point as taught above.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reed et al. (5,619,034) in view of Park (6,107,625) in view of Cotter et al. (5,202,563) in view Cornish et al. (5,464,985), and further in view of Dowell (5,331,158). Cornish et al. teach that ions are formed and accelerated and fragmentation is induced by collisions with a target gas (col. 5, lines 11-14). This collision with the target gas can serve to trap the particles. But, they do not teach the injection of this gas. However, Dowell teaches of two ion beams that pass through a gaseous dispersion of injected sample gas (col. 7, lines 55-60). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to inject this gas into the appropriate zone so that it interacts with the particles so that a means of trapping can occur to prevent particles with higher kinetic energy from overtaking those with lower kinetic energy.

Response to Arguments

Applicant's arguments filed January 16, 2003 have been fully considered but they are not persuasive. In regards to the argument that the prior art does not teach the intercepting of some of the ion beam and permitting of the rest to continue past, the Cotter et al. reference clearly teaches this as taught above. Further, it regards to the argument that the prior art does not teach trapping before acceleration, the Examiner

reads that since the ions are continually reflected back and forth between the acceleration means and reflectron (Park 6,107,625), these ions are viewed as being trapped and since they are reflected back they will undergo subsequent acceleration each time they are reflected back to the acceleration means.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul Gurzo whose telephone number is (703) 306-0532. The examiner can normally be reached on M-Thurs. 7:30 - 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Lee can be reached on (703) 308-4116. The fax phone numbers for the

organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

PMG
February 13, 2003

JOHN R. LEE
SUPERVISORY PATENT EXAMINER
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